NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT

Project Title:	**Handbook of Scour Countermeasures Designs**
RFP NUMBER**: NJDOT #2002-11**	NJDOT RESEARCH PROJECT MANAGER: **Nazhat Aboobaker**
TASK ORDER NUMBER: **RFCUNY 21 / 49777-11-04**	PRINCIPAL INVESTIGATOR: **Anil K. Agrawal**
Project Starting Date: **Jan. 1, 2003** **Original** Project Ending Date: **Dec. 31, 2004** **Modified Completion Date:**	Period Starting Date: **July 1, 2004** Period Ending Date: **September 30, 2004**

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Literature Search	10	100	100	10
1. Dissemination of Literature Search	15	100	100	15
2. Selection and Analysis	25	100	100	25
3. Identification & Guidelines	30	75	75	22.5
4. Final Report	20	50	50	10
TOTAL	100%	335	375	82.5.00
Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete

Project Objectives:

The main goal of the "Handbook of Scour Countermeasures Designs" is to present practical solutions in a concise manner for use by a bridge design engineer. Since the type and effectiveness of a scour countermeasure depends on geological and hydraulic conditions at a particular location, the handbook will classify various scour critical bridges in New Jersey on the basis of:

- Different types of rivers in New Jersey
- Different functional classification of bridges, such as bridges located on interstates, minor arterial highways and local roads
- Geological conditions, e.g., locations of rocks in different counties in New Jersey.

Some of the important aspects of the development of the handbook are summarized in the following:

- The development of this Handbook will be based on an in-depth investigation and review of numerous technical publications and guidelines adopted by other DOTs on scour countermeasures for various types of scour conditions.
- In this research, existing theoretical and experimental studies on scour countermeasures carried out in USA and abroad will be utilized to identify and classify most appropriate technologies for scour countermeasures for a particular location for repeated use.

- The practical guidelines in the Handbook will assist engineers in the selection of appropriate technologies to facilitate the overall design of countermeasures for existing bridges and new constructions.
- The Handbook will contain guidelines for application, design and construction of these selected permanent scour countermeasures for identified scour critical bridges in New Jersey.
- A chapter in the handbook will summarize the theoretical and experimental approach on the state-of-the-technology of various scour countermeasures for easy reference of the designers and engineers.
- These guidelines will also address the issue of emergency action countermeasures. Such countermeasures are important for less-critical bridges for which monitoring countermeasures (using instruments or visual inspection or both) are adopted.

Project Abstract:

Bridge engineers are presented with numerous tidal flow and non-tidal scour countermeasure designs for application to scour critical bridges. A wide variety of countermeasures are presented in the publications, such as HEC-23, Melville and Coleman (2000), Park (2000), NJDOT (1998), etc., to control channel instability and to mitigate scour at foundations of abutments and piers. These countermeasures are applicable to bridges with known foundations and unknown foundations (for which no drawing exists). The focus of this research will be the identification of technologies and solutions most appropriate for scour countermeasures of bridges in New Jersey. The selection of identified technologies will depend on factors such as structural type, stream geometry, stream soil conditions, and environmental constraints. Economic and cost effective technologies of countermeasures will be determined to match New Jersey resources and scour countermeasures for both existing structures and new bridge constructions. Identification of additional new technologies and innovative concepts, e.g., Gabion wire basket anchor block, Gabion mat, flexible channel liner, geo-textile containers, delta-wing-like-fin in front of bridge piers, slot through piers, submerged vanes, training walls, etc., will be investigated to analyze their potential of scour mitigation and cost-effectiveness. Appropriate guidelines for these additional countermeasures will be developed based on existing theoretical and experimental knowledge.

1. Progress this quarter by task:

Task 2 has been finished completely. Approximately 75% of Task 3 and 50% of Task 4 has been completed.

2. Proposed activities for next quarter by task

The PI plans to submit draft final report in the next quarter. Individual chapters of the report will be submitted for detailed technical review.

3. List of deliverables provided in this quarter by task (product date)

None

4. Progress on Implementation and Training Activities

None

5. Problems/Proposed Solutions: None

Total Project Budget	$160,004
Modified Contract Amount:	
Total Project Expenditure to date	$128,000
% of Total Project Budget Expended	80%

NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT

Project Title:	Identification of Traffic Control Devices for Mobile and Short Duration Work Operations
RFP NUMBER: Project 2003-27	NJDOT RESEARCH PROJECT MANAGER: Ed Kondrath
TASK ORDER NUMBER:: RFCUNY 23-01	PRINCIPAL INVESTIGATOR: Robert E. Paaswell, Ph.D.
Project Starting Date: 01/01/04 **Original** Project Ending Date: 12/31/04 **Modified Completion Date:**	Period Starting Date: 07/01/04 Period Ending Date: 09/30/04

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Literature Search	25%	100%	100%	25%
Task 1: Develop methodology and criteria for evaluating devices	12%	100%	100%	12%
Task 2: Analyze NJDOT practices for work zone operations	8%	100%	100%	8%
Task 3: Identify guidelines to eliminate driver inattentiveness	5%	50%	100%	5%
Task 4: Identify alternative techniques for traffic control	8%	50%	50%	4%
Task 5: Prepare guidelines	8%	25%	25%	2%
Final Report and Implementation	34%	10%	10%	3.4%
TOTAL	100%			60%

Project Objectives:
The overall objective of this research project is to study mobile work zone safety with particular attention to the identification of work zone safety devices, information systems for the reduction of safety and congestion, and implementation of innovative techniques to reduce delays and crashes due to work zones. The specific objectives are to:

- Provide improvements for maximum protection of the motoring public and workers in the work zone and in the set up of the work zone,
- Identify state-of-the art work zone technologies to improve worker safety in mobile work zone and short term maintenance operations,
- Identify information systems for work zone traffic control to reduce delays and crashes,
- Meet the current standards established by internal policies of the NJDOT,
- Identify “best practices” for the use of law enforcement to improve work zone safety,
- Identify key issues to be considered from public outreach and information systems.

Project Abstract:
This research will include the identification of potential technologies and information systems, evaluation of the identified devices and systems with appropriate maintenance yards and crews, and the parathion of specifications and Baseline Document Change papers for adoption by the NJDOT. Potential technologies and information systems will be identified from the NJDOT New Technologies and Products database of approved and under evaluation products, Transportation Research Board and National Cooperative Highway Research Program reports, international sources, Strategic Highway Research Program reports, other State DOT correspondence, and manufacturers and vendors. The identified technologies and information systems will be researched to obtain users and technical information on their effectiveness.

1. Progress this quarter by task:

The research team met with the NJDOT engineers and Rod Roberson of Rutgers University to discuss the development of the New SHRP equipment, and the demonstration of this equipment in New Jersey. Rutgers is preparing a proposal to present information about this equipment to the engineers for the purpose of funding a complete demonstration. The NJDOT elected to proceed with the demonstration of SHRP in place of the field evaluation of other safety equipment.

2. Proposed activities for next quarter by task:

- Rutgers University will prepare a presentation and demonstration of the new SHRP equipment.
- The final report will be prepared to document the previous tasks, purchasing procedures for NJDOT equipment, and recommendation for implementation of safety equipment on NJDOT mobile and short duration work zones.
- A presentation will be prepared to document the study and present the result aand finding to the NJDOT.

3. List of deliverables provided in this quarter by task (product date)

Rutgers University will present a proposal to present and demonstrate new SHRP equipment.

4. Progress on Implementation and Training Activities

NA

5. Problems/Proposed Solutions

None

Total Project Budget	$72,294
Modified Contract Amount:	
Total Project Expenditure to date	$43,376.00
% of Total Project Budget Expended	60%

NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT

Project Title:	Technology Transfer
RFP NUMBER: NA	NJDOT RESEARCH PROJECT MANAGER: Nick Vitillo
TASK ORDER NUMBER:: RF-CUNY 24-01	PRINCIPAL INVESTIGATOR: Robert Paaswell
Project Starting Date: 01-01-04 Original Project Ending Date: 12-31-04 **Modified Completion Date:**	Period Starting Date: 07-01-04 Period Ending Date: 09-30-04

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Lecture Series	15%	33%	100%	15%
Research Newsletter	15%	100%	100%	15%
NJDOT Annual Report	10%	0%	0%	0%
US DOT Reporting Requirements (Annual Report, Semi-Annual Report, etc…)	25%	50%	100%	25%
Publication & Distribution of Research Papers	10%	50%	50%	5%
Process Request for Proposals	15%	100%	100%	15%
Participate in Conferences	10%	20%	60%	6%
Total	100%			81%

Project Objectives:
The objectives of the Technology Transfer program are:

- To increase the awareness and level of information concerning transportation issues facing US DOT Region 2 for all within the region;
- To improve the knowledge base and approach to problem solving of the region's transportation workforce, from those operating the systems to those at the most senior levels of managing the system; by doing so, to improve the overall professional capability of the transportation workforce;
- To stimulate discussion and debate concerning the integration of new technologies into our culture, our work and our transportation systems;
- To provide the more traditional but extremely important job of dissemination of research and project reports, studies, analysis and use of tools to the education, research and practicing community;
- To provide unbiased information and testimony to decision-makers concerning regional transportation issues consistent with the UTRC theme.

Project Abstract:
The goal of the Technology Transfer Program for the New Jersey Department of Transportation is to provide research results to potential users in a form that can be directly implemented, utilized and applied to transportation operations.

As of 2/06/2004

1. Progress this quarter by task:

- The UTRC completed the fourth and final Visiting Scholar Seminar
- The UTRC completed the Annual Report in response to the USDOT Grant Requirements. The report will be presented to the NJDOT after publication.
- The UTRC attended NJDOT Quarterly report meetings and a budget meeting to discuss invoices.
- The UTRC prepared the 2005 Technology Transfer proposal and presented the proposal to the NJDOT for discussion.
- The UTRC participated in the Annual Research Showcase meetings.
- The UTRC published and forwarded NJDOT final reports to the USDOT.

2. Proposed activities for next quarter by task:

- The UTRC has offered to assist the NJDOT with short term technical projects and provide experts to present timely topics to interested NJDOT engineers. The UTRC is able to participate in TRB, NCHRP Panels and other such activities where the NJDOT may not have sufficient staff
- The USDOT Annual Report will be distributed.

3. List of deliverables provided in this quarter by task (product date)

US DOT Annual Report

4. Progress on Implementation and Training Activities:

NA

5. Problems/Proposed Solutions

NA

Total Project Budget	$69,629
Modified Contract Amount:	
Total Project Expenditure to date	$27,800
% of Total Project Budget Expended	40%